Orbit Determination

Lisa Policastri

Orbit Determination Analyst

NRL

202-767-9166

lpolicastri@space.nrl.navy.mil

Requirements

- **Post-Processed Velocity Knowledge Is 1 cm/sec**

- **Single Tracking Site at Blossom Point**

- **Minimize Range and Two-way Range-Rate Collection**

Baseline Approach

- **Derive Tracking Accuracy Requirements for Mission Operations**

- **Compare Covariance Analysis and Monte-Carlo Simulation for Defining Tracking Requirements**

- **Recommend Tracking Implementation and Tracking Schedule to Meet Mission Requirements**

- **Determine the Data Arc Length for Best Velocity Fit: 4 Day Batch Fit**

- **Provide Tracking Data Analysis for Orbit Transfer Plan**

Baseline Tracking Schedule and Prediction Performance

Data:	Rate	Durations	Intervals	Bias	Noise
Range :	1 pt every min	10 min	8 hrs	15 m	3 m
Range-Rate:	1 pt every 3 mins	1 hr	24 hrs	0 mm/s	3 mm/s

Velocity Error	Avg	Min	Max
cm/s	1.12	1.04	1.19

Noise Includes 3 σ Error Predictions

Baseline Prediction Format

- **Post-Fit and Predict Updates Will Occur Once Per Business Day**

- **Predict Files Will Contain the Following in 60 Second Intervals:**

  - **Time in TAI**

  - **Position Coordinates in Km**

  - **Velocity Coordinates in Km/s**

  - **Geocentric Celestial Reference Frame**

- **Each 4 Day Fit File Will Contain Less Than 1 MB of Data**